26. A method for the selective oxidation of sulfur-containing compounds to elemental sulfur, comprising passing a hydrogen sulfide-containing gas together with an oxygen-containing gas at an elevated temperature over the catalyst according to claim 1, 17, or 18.

27. A method according to claim 26, wherein the molar ratio of oxygen to hydrogen sulfide is maintained between 0.5 and 25.

Remarks

Original, dependent claims 2-14 were cancelled without prejudice in the Preliminary Amendment submitted January 17, 2001. Pending claim 1 is hereby amended and new claims 15-27 are added. This Amendment adds no new matter but finds support in the specification as filed.

Base claim 1 is for a catalyst on a support, which comprises at least one catalytically active material comprising comprising "an atomically mixed oxide having atomically mixed iron ions and zinc ions in an oxidic lattice". This phrase finds support in the specification at least at page 5, lines 22-32, page 14, lines 21-30, the Mössbauer spectra data of Fig. 3, discussed at page 15 (especially lines 7-8), and page 16, lines 26-27. The added clause at the end of claim 1, and in the specification at page 7, line 29, relating to the catalyst having "a specific surface area of more than 20 m^2/g", finds support in at least original claim 7. The added clause in claim 1 relating to the catalyst exhibiting "substantially no Claus activity" finds support at least at page 6, lines 21-24.

It is submitted that the claim language, including the phrase "*atomically mixed* oxide having *atomically mixed* iron ions and zinc ions in an oxide lattice…", accurately and precisely

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES LLP
TEL (617) 542-2290
FAX (617) 451-0313

describes the catalysts of the invention to one of ordinary skill in the field of catalytic oxidation, particularly oxidation of sulfur compounds. It also identifies the feature contributing to the present catalyst's improved performance: the atomic mixing of iron and zinc ions. This atomic mixing improves the present catalyst's selectivity for hydrogen sulfide (H_2S) conversion to elemental sulfur at higher temperatures, particularly above 240°C. (See, e.g., specification at page 14, line 21 to page 15, line 3, Figs. 2A-2B; and enclosed Declaration of Dr. John Wilhelm Geus.) The ordinarily skilled artisan would have appreciated that a catalyst whose selectivity for H_2S-to-S conversion decreases less fast with increasing temperature, such as that of the present invention, better retains its effectiveness and makes it possible to greatly reduce emission of sulfur compounds, e.g., sulfur dioxide, from Claus plants. (See page 15, lines 3-5 of the specification; and Dr. Geus's Declaration, paragraphs 5-8.) As well, as declared by Dr. Geus (in paragraphs 13-20), that artisan would appreciate that atomic mixing of the iron and zinc ions could be confirmed by examining the Mössbauer spectra of the present catalyst (see page 15, lines 7-25 of the specification). He or she would realize, based on the specification taken in view of the prior art, that an atomically mixed iron/zinc oxide catalyst of the invention would have a Mössbauer spectrum like that of zinc ferrite ($ZnFe_2O_4$) (see, e.g., Fig. 3(a)-(c) of the specification).

New claims 15-16 find support at least in original claim 6 and page 6, lines 15-17 of the specification. Claims 17-18 find support at least from original claim 7, page 7, line 29, and page 8, lines 7-12.

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TEL (617) 542-2290
FAX (617) 451-0313

Claims 19-23 correspond to original claims 8-12, regarding the chloride used in the preparation of catalysts of the invention. Claims 22-23 recite "an amount of chloride", which is applied to the surface of the support material during or after the impregnation step. Claims 24-25 specify that the chloride is applied as ammonium chloride. This aspect finds support at least page 10, lines 6-12, which teaches that:

> "Through the application of a *controlled amount of chloride*, for instance in the form of NH_4Cl, the sintering of metals can be eminently controlled and at the same time the formation of a mixed oxide is promoted [in contrast to a 'mixture of oxides' as in line 23]. ... In other words, a weight ratio of metal ions to *chloride* between 4:1 and about 1000:1 is used."

Applicants submit that the ordinarily skilled artisan would have appreciated, at the time of filing, that it is the chloride ions that contributed to the atomic mixing of the metal ions, and that another source of chloride could be used, aside from ammonium chloride. This is supported by the enclosed Dr. Geus's Declaration, paragraphs 21-23.

Claims 26-27 correspond to original claims 13-14.

In view of the foregoing amendments and remarks, it is submitted that the application is in condition for allowance.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES LLP
TEL (617) 542-2290
FAX (617) 451-0313

Should the Examiner have questions or suggestions for expediting this application toward allowance, he is invited to telephone Applicants' attorneys, particularly Holliday C. Heine, Registration No. 34,346, of record, or Arthur S. Morgenstern, Registration No. 28,244.

Respectfully submitted,

JOHN WILHELM GEUS, ET AL.

By Holliday C. Heine
Holliday C. Heine, Ph.D.
Registration No. 34,346
Attorney for Applicants

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES LLP
Ten Post Office Square
Boston, Massachusetts 02109

Telephone: (617) 542-2290
Telecopier: (617) 451-0313

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Enclosures

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES LLP
TEL (617) 542-2290
FAX (617) 451-0313

MARK-UP OF SPECIFICATION AND CLAIM AMENDMENTS

In the Specification

Page 7, line 29:

"...specific surface area is at least 20 m^2/g, preferably more than 25 m^2/g, since at such...".

In the Claims

1. (Amended) A catalyst on a support for the selective oxidation of sulfur-containing compounds to elemental sulfur, comprising at least one catalytically active material that is present on a support material, wherein the catalytically active material [consists at least partly of] comprises a mixed oxide having [with] atomically mixed iron ions and zinc ions in an oxidic lattice, [in which at least two metals in the form of ions are included] which catalyst has a specific surface area of more than 20 m^2/g and exhibits substantially no Claus activity under the reaction conditions of said selective oxidation.

New claims 15-27 have been added.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES LLP
TEL (617) 542-2290
FAX (617) 451-0313